

AMENDMENTS TO THE CLAIMS

Please amend the Claims as follows:

Please cancel claims 1-22 and add claims 23-44 as follows.

23. (Newly Added) A robust computer-based method for updating a computer-stored hierarchical structure of nodes via a node identification technique, said update retaining properties and parent/child relationships of said hierarchical structure without renumbering existing node ID values associated with said hierarchical structure, said method comprising the steps of:

(a) receiving an instruction to insert a new node at an insertion point in said computer-stored hierarchical structure;

(b) identifying one of, or a combination of the following: a left node ID value closest to the left of said insertion point or a closest right node ID value closest to the right of said insertion point;

(c) calculating a new ID value based upon node ID value(s) identified in (b), said calculated value greater than ID values of nodes to the left of said insertion point and less than ID values of nodes to the right of said insertion point, said new ID value based upon a low/high key value, said high key value representing positive infinity and said low key value representing negative infinity; and

(d) updating said computer-stored hierarchical structure by inserting said new node and associating said inserted node with said calculated ID value, wherein order, node ID values, and relationships between parent, child, and siblings in said hierarchical structure of nodes remain unchanged with said insertion of new node.

24. (Newly Added) A computer-based method as per claim 23, wherein said new ID value is calculated via any of the following steps: concatenating said left node ID value with one or more high key values and a positive value or concatenating said left node ID value with one or more low key values and a positive value.

25. (Newly Added) A computer-based method as per claim 23, wherein a digit in said calculated ID value has a negative value.

26. (Newly Added) A computer-based method as per claim 23, wherein counts between nodes in said hierarchical structure of nodes have a gap and said high key value equal to said gap value.

27. (Newly Added) A computer-based method as per claim 23, wherein said ID values are encoded and are byte comparable.

28. (Newly Added) A computer-based method as per claim 23, wherein said nodes are associated with a mark-up language based document.

29. (Newly Added) A computer-based method as per claim 28, wherein said mark-up based language is XML.

30. (Newly Added) A computer-based method as per claim 23, wherein said method is implemented in conjunction with a relational database.

31. (Newly Added) An article of manufacture comprising a computer usable medium having computer readable program code embodied therein which updates a computer-stored hierarchical

structure of nodes via a node identification technique, said update retaining properties and parent/child relationships of said hierarchical structure without renumbering existing node ID values associated with said hierarchical structure, said medium comprising:

(a) computer readable program code aiding in receiving an instruction to insert a new node at an insertion point in said computer-stored hierarchical structure;

(b) computer readable program code identifying one of, or a combination of the following: a left node ID value closest to the left of said insertion point or a closest right node ID value closest to the right of said insertion point;

(c) computer readable program code calculating a new ID value based upon node ID value(s) identified in (b), said calculated value greater than ID values of nodes to the left of said insertion point and less than ID values of nodes to the right of said insertion point, said new ID value based upon a low/high key value, said high key value representing positive infinity and said low key value representing negative infinity; and

(d) computer readable program code updating said computer-stored hierarchical structure by inserting said new node and associating said inserted node with said calculated ID value, wherein order, node ID values, and relationships between parent, child, and siblings in said hierarchical structure of nodes remain unchanged with said insertion of new node.

32. (Newly Added) An article of manufacture as per claim 31, wherein said new ID value is calculated via any of the following steps: concatenating said left node ID value with one or more high key values and a positive value or concatenating said left node ID value with one or more zeros and a positive value.

33. (Newly Added) An article of manufacture as per claim 31, wherein said ID values are encoded and are byte comparable.

34. (Newly Added) An article of manufacture as per claim 31, wherein said nodes are associated with a mark-up language based document.

35. (Newly Added) An article of manufacture as per claim 34, wherein said mark-up based language is XML.

36. (Newly Added) An article of manufacture as per claim 31, wherein said medium works in conjunction with a relational database.

37. (Newly Added) An article of manufacture as per claim 31, wherein counts between nodes in said hierarchical structure of nodes have a gap and said high key value equal to said gap value.

38. (Newly Added) An article of manufacture as per claim 31, wherein a digit in said calculated ID value has a negative value.

39. (Newly Added) A computer-based method for updating a computer-stored hierarchical structure of nodes without renumbering existing node ID values associated with said hierarchical structure, said method comprising the steps of:

(a) receiving an instruction to insert a new node at an insertion point in said computer-stored hierarchical structure;

(b) identifying one of, or a combination of the following: a left node ID value closest to the left of said insertion point or a closest right node ID value closest to the right of said insertion point;

(c) calculating a new ID value for node to be inserted based upon a low key value 0 or a high key value x, said high key value representing positive infinity and said low key value representing negative infinity, said calculation performed via one of the follows ways: concatenating said left node ID value with one or more high key values and a positive value or concatenating said left node ID value with one or more low key values and a positive value; and

(d) updating said computer-stored hierarchical structure by inserting said new node and associating said inserted node with said calculated ID value, wherein order, node ID values, and relationships between parent, child, and siblings in said hierarchical structure of nodes remain unchanged with said insertion of new node.

40. (Newly Added) A computer-based method as per claim 39, wherein a digit in said calculated ID value has a negative value.

41. (Newly Added) A computer-based method as per claim 39, wherein said ID values are encoded and are byte comparable.

42. (Newly Added) A computer-based method as per claim 39, wherein said nodes are associated with a mark-up language based document.

43. (Newly Added) A computer-based method as per claim 42, wherein said mark-up based language is XML.

44. (Newly Added) A computer-based method as per claim 39, wherein said method is implemented in conjunction with a relational database.